Optimization of heterogeneous biodiesel production from waste cooking palm oil via response surface methodology

Abstract:

Heterogeneous transesterification of waste cooking palm oil (WCPO) to biodiesel over Sr/ZrO2 catalyst and the optimization of the process have been investigated. Response surface methodology (RSM) was employed to study the relationships of methanol to oil molar ratio, catalyst loading, reaction time, and reaction temperature on methyl ester yield and free fatty acid conversion. The experiments were designed using central composite by applying 24 full factorial designs with two centre points. Transesterification of WCPO produced 79.7% maximum methyl ester yield at the optimum methanol to oil molar ratio = 29:1, catalyst loading = 2.7 wt%, reaction time = 87 min and reaction temperature = 115.5 °C.